

thinXXS Microtechnology

Comprehensive Microfluidics Solutions
for Diagnostics and Life Sciences



thinXXS
• MICROTECHNOLOGY

Intelligent Solutions for Life™
Fluidics | Optics | Consumables | Assemblies

We Make Your Ideas Flow

INSIGHT INTO YOUR APPLICATIONS

As the world of life science becomes increasingly complex, developers are challenged to build solutions that enable more analysis on smaller samples with easier user workflows. Whether you're creating instruments for life science research or diagnostics, there's a likelihood your application will require microfluidics. Our experts enable microfluidics that simplify workflows for assays in a wide range of applications, and we partner with you to develop intricate technology while streamlining functionality, manufacturability, and costs.

ASSAYS ENABLED BY MICROFLUIDICS

We are proud to be one of the few OEM suppliers with a demonstrated capability to make complex assays work on microfluidic cartridges. From flow cells and droplet generators for genomics to complex sample-to-answer solutions for point-of-care or in-field testing, we are a recognized leader in miniaturizing an entire laboratory setup into a single device — with on-card reagents, pumps, valves, sensors, and optical interfaces.



Applications



LABORATORY TESTING



ORGAN-ON-A-CHIP



MULTIPLEXING



DIGITAL DROPLET TECHNOLOGIES



DRUG ENCAPSULATION



NEXT-GENERATION MOLECULAR TECHNOLOGIES



CELL SEPARATION AND CELL-BASED ASSAYS



POINT OF USE



DRUG DELIVERY



NANOPARTICLE PREPARATION



SAMPLE PREPARATION



LIQUID BIOPSY

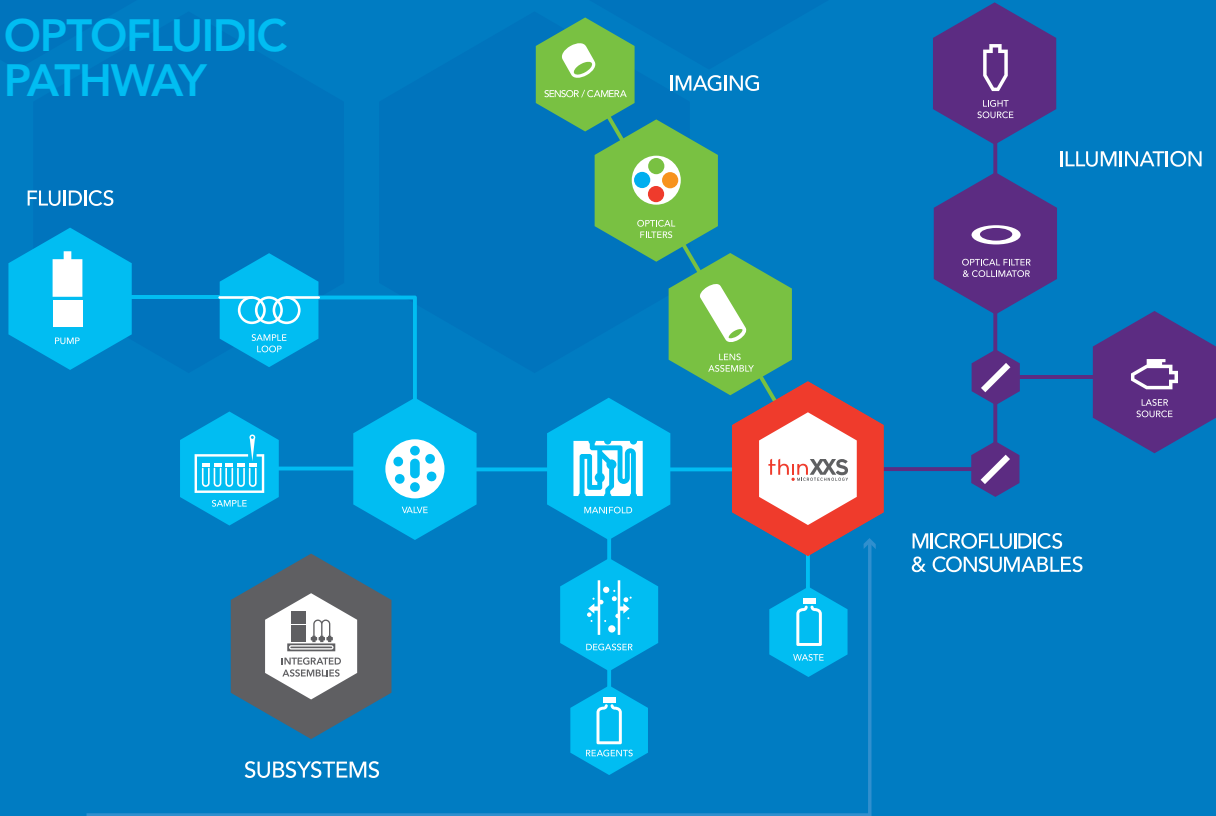


MOLECULAR & IMMUNOLOGIC ASSAYS

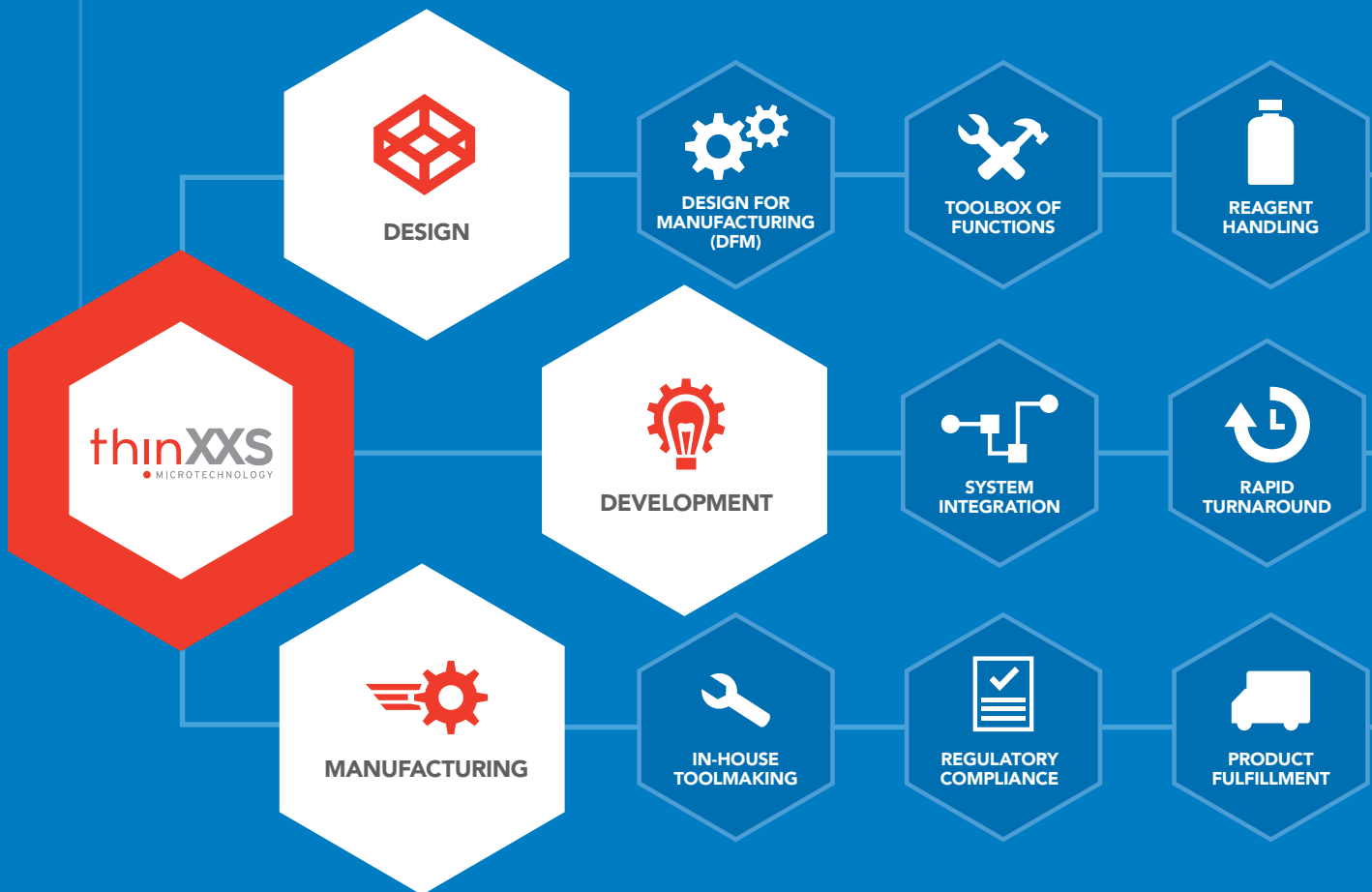


ENVIRONMENTAL TESTING

OPTOFLUIDIC PATHWAY



COMPREHENSIVE MICROFLUIDIC SOLUTIONS



Capabilities

WE WELCOME THE MOST AMBITIOUS PROJECTS

Microfluidic development projects require highly sophisticated technologies and sensitive materials to provide optimized and reliable performance. Although microfluidic consumable devices are undeniably complex, our experts make it easier to develop the right tools for your application.

We are uniquely positioned to solve even the most demanding microfluidic challenges in a wide array of markets and applications. From our extensive experience working with our customers, we've evolved a best-practice collaboration path to guide the optimization of your optofluidics solution with expert precision.

BIG PICTURE OPTOFLUIDICS

Through intimate collaboration we deliver a broad range of microfluidic solutions for diagnostics and life science research that support and guarantee your success with masterful know-how that unites the intersections of fluidics, optics, and chemistry.





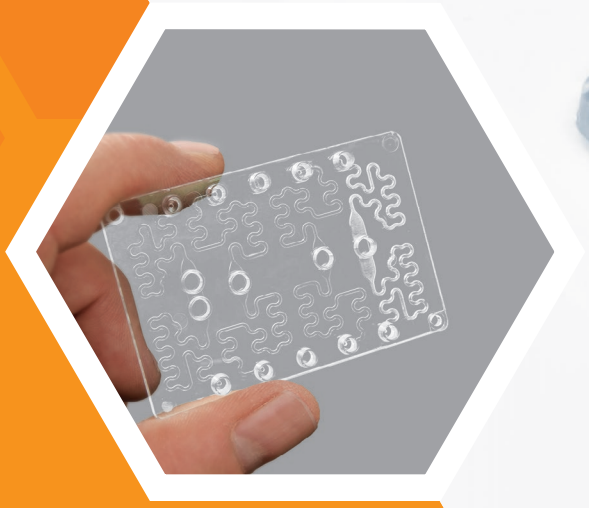
Microfluidic Consumables

WE HELP YOU INNOVATE DOWN TO THE MINUTE DETAIL, SO YOU CAN ACHIEVE YOUR GOALS

Producing low-cost, highly-accurate, and large-volume consumables for the life science and diagnostics markets is not an easy task. We aim to exceed your quality and reliability expectations, because we understand what's at stake, recognizing that both critical research and patients rely on precise results at every level. The goal of most microfluidic systems is to achieve a higher degree of integration than otherwise possible, thereby reducing size and cost, as well as increasing workflow efficiency and/or analysis speed.

With decades of expertise in microfluidic design and manufacturing, we ensure your microfluidic consumable will comply with the strictest standards in reproducibility while achieving world-class performance. You can proceed to market quicker and with greater confidence to achieve your goals.







Sample-to-Answer Solutions

WE SIMPLIFY COMPLEX CONSUMABLES INTEGRATION, SO YOU CAN KEEP MOVING FORWARD

The design and integration of sample handling, wet and dry reagents management, and assay detection into a microfluidic system requires ingenuity and precision to assure testing accuracy and reliability in the field. Many developers of sample-to-answer solutions struggle with the challenges to minimize size, reduce cost, and simplify workflows. This is especially true when relying upon a mix of vendors and components that weren't designed together or designed by experts with deep life science consumables knowledge.

As the world's largest OEM partner for integrated consumables, we provide comprehensive solutions throughout the market to serve many applications. We have the technology, expertise, and experience to design for these challenges from the very beginning. From CAD to prototype, and from pilot to mass-production, we look to de-risk your development, allowing you to focus on achieving results.

When it comes to challenging sample-to-answer solutions, we have you covered. For on-board reagent and fluid management, our proprietary components and processes allow for wet or dry reagent storage in a safe and reliable solution. Our capabilities to manufacture and integrate plastic, glass, reagent, and detection components is unrivaled by others in the life science community.

We have microfluidic solutions for any conceivable life science consumable or development project. Our unique capabilities maximize assay performance, reduce risk, and enable complete optimization of your optofluidic pathway into a single integrated device.



SAMPLE INTRODUCTION



SAMPLE PREP



MIXING



FLUID TRANSFER



ON-BOARD REAGENTS (WET & DRY)



OPTICAL OR ELECTRICAL DETECTION (SENSING)



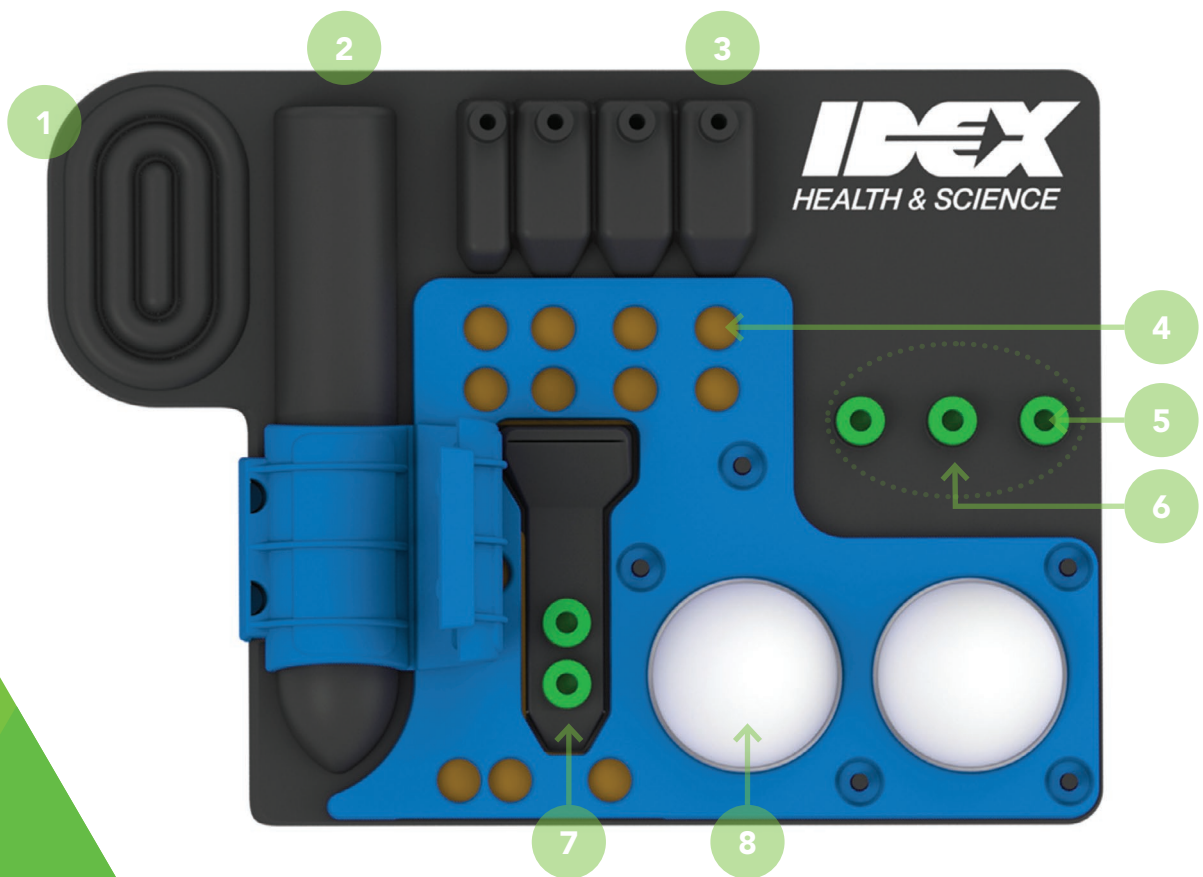
INTEGRATED PUMPS & VALVES



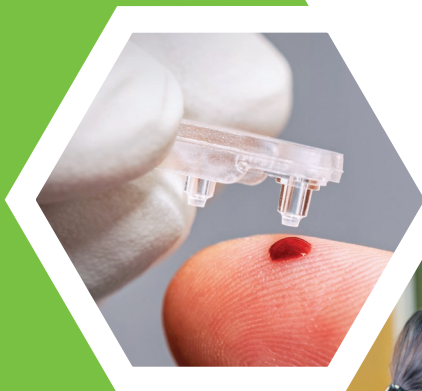
PARALLELIZATION



WASTE MANAGEMENT



- | | |
|--------------------------|----------------------------|
| 1 HANDLE | 5 REAGENT PLUGS |
| 2 SAMPLE INLET | 6 DETECTION AREA |
| 3 WET REAGENT CONTAINERS | 7 REAGENT PLUGS |
| 4 VALVES | 8 BELLOWS (DIAPHRAGM PUMP) |



Solving Problems

POWERFUL PARTNERSHIPS MAKE IT ALL POSSIBLE

We are responsible for designing unique solutions to complex diagnostic problems that require expertise in a wide range of fields that fully address the risks associated with bringing a new product to market.

Our access to sophisticated, state-of-the-art technologies in manufacturing – coupled with nearly two decades of experience in developing high-value, cost competitive, custom solutions — means we have the ability and confidence to guarantee project success. Through practiced collaboration we can enable your next success story, with innovation and support, always keeping time-to-market at the forefront.



Design & Development

WE ENABLE YOUR PROGRESS BY OPTIMIZING MICROFLUIDIC SYSTEMS

We don't just build components, we also create leading-edge solutions that maximize performance and enable the complete optimization of the optofluidic pathway. We manufacture highly trusted devices for life science instruments that perform precision microfluidic analysis tasks.



Browse through our partnership case studies on the next few pages to see how partnership is the new innovation for microfluidics.





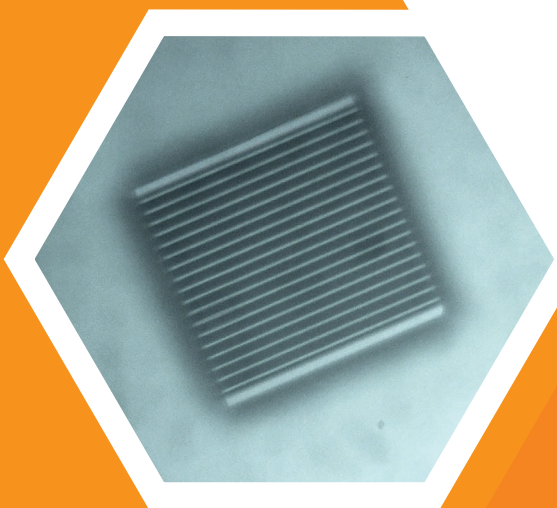
Pinpointed Detection

CUSTOMER REQUIREMENT:

The readout of Lab-on-a-chip consumables is mostly done by automated instruments, either electrical/electrochemical, or optical. In case of an optical detection, the alignment of the consumable with the instrument plays a key role and should be addressed from the very beginning in the design and engineering phase. As an example, the typical beam diameter for optical readout in a laser-based flow cytometer is in the range of some hundred microns, while the critical detection area for many diagnostic applications is in the 10-50 microns range. How can the laser detect cells/particles in such small areas, despite the fact that process related tolerances cannot be eliminated completely?

SOLUTION:

A Ronchi Grating was implemented directly onto the consumable, which allows an active alignment by auto-focusing. Since the grating is located in a defined proximity to the detection channel, the instrument can easily detect the position of the disposable and fine-tune for the optical readout.



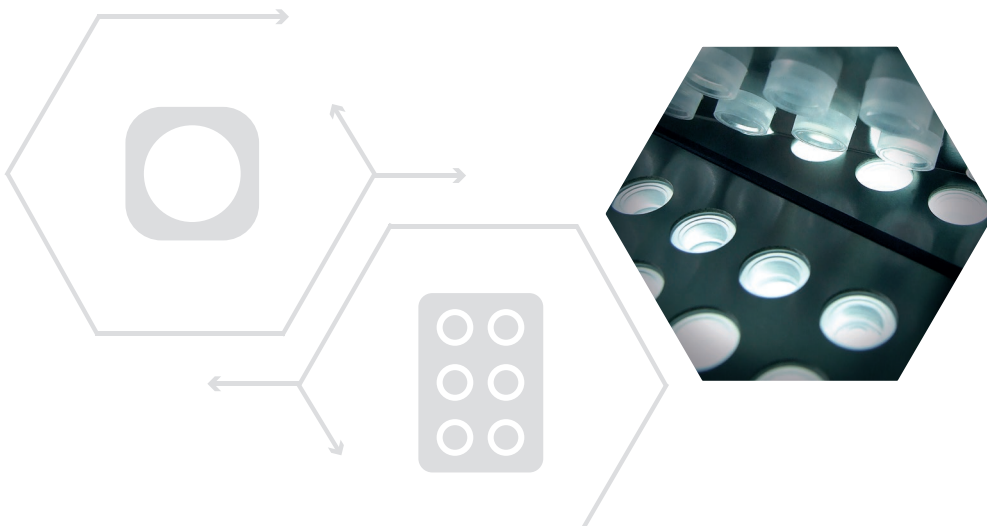
Dry Reagent Storage

CUSTOMER REQUIREMENT:

In addition to the storage of liquid reagents, complex assays often require storage of dry reagents. While dispensing reagents into cavities on the cartridge seems straightforward, realizing this concept on a production level has several drawbacks (e.g. handling of large parts, throughput for the drying process, and possible impact of the manufacturing and assembly processes on the reagent). Hence a reliable, cost effective, and scalable solution for bringing dry reagents onto Lab-on-a-chip cartridges is needed.

SOLUTION:

Reagents are dispensed and dried onto reagent carriers, so-called reagent plugs ("RP"). These plugs are prepared independently from the cartridge in larger batches, functionalized on a SBS titer-plate format, and assembled to the cartridge in a final assembly step. The plastic material of the plug, the capacity, and its surface properties/coatings can be optimized independently from the material of the fluidic cartridge. Furthermore, the processes for dry reagent preparation can be developed and performed independently of the cartridge manufacturing processes using standard equipment (e.g. titer-plate format). This concept has been proven to be scalable and compatible with industrial functionalization and assembly processes. In several projects, yields and cartridge costs could be significantly improved over conventional storage concepts. In addition, the proprietary RP approach reflects the platform character of many POC applications, where different assays are reflected differently functionalized carriers, while the ordinary consumable manufacturing process chain keeps unchanged.





Liquid Reagent Storage

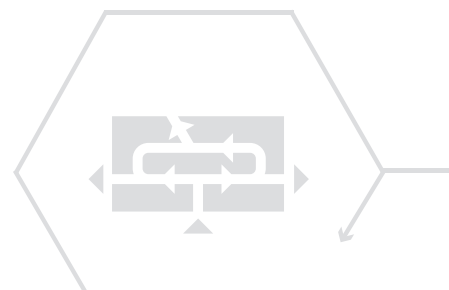
CUSTOMER REQUIREMENT:

Lab-on-a-chip consumables often require storage of liquid reagents on the consumable itself to provide a fully self-contained cartridge which runs without liquid interfaces to the instrument. Hence a reliable, cost effective, and mass manufacturable solution for the storage of liquid reagents is needed. In addition, the storage concept must fulfill the following requirements:

- › Protection and preservation of reagent stability during manufacturing and assembly as well as long-term storage
- › Chemical and/or biological compatibility with different reagent types to be stored, no leaching of substances which could affect the assay
- › Application of a reproducible mechanism to open the storage container for reagent release and dispense

SOLUTION:

Liquid reagents have been stored on both blister packs and in cavities on the chip. For the blister storage concept, the blister pack is formed of a composite-layer film, assembled to the cartridge backbone, and filled with the liquid reagent. A small channel connects the blister to the rest of the fluidic network of the cartridge. This channel provides a frangible seal. Once the blister is pressed by the instrument (or manually), this seal opens. With such a concept, a controlled release of the liquid reagent is achieved. The materials used offer protection against environmental conditions (gas exchange, etc.) and the reagent is stored without residual air in the blister. Depending on the number of reagents and the volume to be stored, the concept of storing liquid reagents in cavities on the chip can be advantageous. Since most Lab-on-a-chip platforms are made of polymers, it is essential to use polymers with sufficient barrier properties to allow storage of volatile reagents. Again, the cavities are closed with frangible seals or frangible seal film valves which are opened by the instrument.



On-Chip Pump Mechanism

CUSTOMER REQUIREMENT:

Consumables in the diagnostic and IVD market often require active fluid transportation on the chip to realize corresponding complex assay flow schemes. Traditionally, such transport is controlled pneumatically via an instrument. However, with this approach, pneumatic interfaces to the disposable consumable are needed which always involve the risk of critical biological contamination. Especially for molecular assays incorporating the amplification of nucleic acids, a self-contained cartridge is stringently required.

SOLUTION:

Depending on the material being used, different on-chip pump mechanisms can be applied to realize fluid transportation in a closed system scenario. One possible solution is the fluid manipulation via one (or more) integrated elastomeric air reservoir, called bellow, realized by a two-component injection molding process. The bellow volume is modified by an instrument-based actuator and due to the hermetically sealed design of the consumable itself, this compression leads to a fluid manipulation. Bellow relaxation on the other hand enables reversal of flow direction.

A different approach is the implementation of a thin-film pump, also mechanically operated by the instrument, into a closed-loop fluidic network. Two layers of film being assembled to the consumable are deflected to form a pump cavity and are operated similar to a peristaltic pump. Both solutions are equally well suited for mass manufacturing processes and facilitate completely sealed and self-contained cartridge designs as a prerequisite for contamination control.





Materials Manufacturing & Processes

WE ARE YOUR HIGH QUALITY SINGLE-SOURCE PARTNER FOR MICROFLUIDICS AND MICROFLUIDIC CONSUMABLES

We don't just build microfluidic components; we also create innovative solutions that maximize performance and enable complete optimization for your microfluidic assays. Our team of scientific and engineering experts are essential in the manufacturing of highly-trusted, microfluidic products. We excel in the design and manufacturing of life science instruments that perform precise sample introduction, reagent handling, sample processing, separation, and other critical analytical tasks.

We invite you to increase performance and efficiency with a consumable that gives you advanced integration at the microfluidic scale.



INNOVATIVE
SOLUTIONS



HIGHLY
TRUSTED



INCREASE
PERFORMANCE



CLASS 10K CLEAN ROOMS
(OVER 20,000 SQF)



Materials

- › Polymers
- › Thermoplastic Elastomers
- › Glass

Bonding

- › Polymer-Polymer
- › Adhesive
- › Laser Welding
- › Heat Staking
- › Ultrasonic Welding

Structuring

- › Injection Molding
- › Laser Cutting
- › Clean Room Manufacturing

Reagent Integration

- › Dry Reagents
- › Wet Reagents
- › Arrays

Assembly

- › Clean Room Assembly
- › Supply Chain Management
- › Automation
- › Validation

Tooling

- › In-house tool making

Staged Development Process



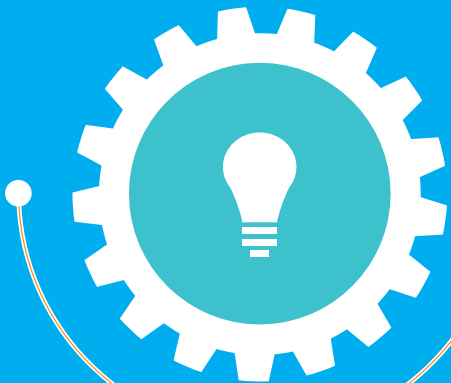
YOU CAN LAUNCH PRODUCTS MORE EFFECTIVELY WITH OUR PRODUCT DEVELOPMENT PROCESS

Using our proven process, we solve your unique problems by innovating projects through efficient product development. We deliver quality technology on time, to secure your success in highly competitive markets.

The more complex a system becomes, the more complicated the process required to build it becomes. We simplify product development with our disciplined process that aligns our expertise with your business objectives to take you from conception to market easier.

New Project Proposals

WE WILL REVIEW YOUR REQUEST AND JOINTLY SCOPE THE PROPOSED PRODUCT



Feasibility Phase

WE EVALUATE THE TECHNICAL FEASIBILITY OF YOUR DESIGNS AND IDEAS



Business Phase

WE PERFORM A TECHNICAL ASSESSMENT AND DEVELOP A BUSINESS CASE





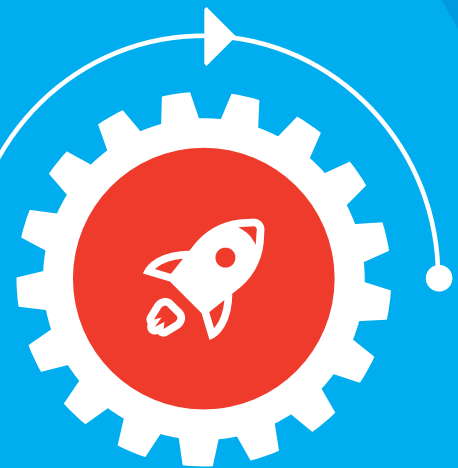
Pre-Production Phase

WE COMPLETE TESTING AND VERIFICATION AND PREPARE TO RELEASE THE PRODUCT



Design Phase

TOGETHER WE ITERATE THROUGH DESIGN AND DEVELOPMENT ROUNDS TO TEST AND VALIDATE



Market Launch

WE ASSIST YOU BEYOND DEVELOPMENT WITH SCALE-UP & PRODUCTION



Manufacturing

WE KEEP IT CLEAN AND ON-TIME

Cleanliness plays a key role in microfluidics manufacturing. Leveraging our state-of-the-art facilities and clean-rooms, we are capable of offering products with the surface qualities you require. We utilize ISO 13485 quality management processes and have the best facilities to create, assemble, and package your microfluidic consumables. We create a balance between functionality, cost, and scalability, and we guarantee you an optimal device that meets your requirements, with minimal time-to-market.

Technically challenging, injection-molded products require stable production processes for mass production. thinXXS Microtechnology is your dependable partner with a long-lasting culture of ongoing development and improvements. We operate in a highly regulated, climate-controlled environment and provide full program documentation and component/device traceability. From small-scale production of prototypes to large-scale production items, our experts adapt to your request. Pair that with our global delivery possibilities, we are your ideal partner for microfluidic consumables, consumable components, and sample-to-answer solutions.



LIFE SCIENCE
QUALITY STANDARDS



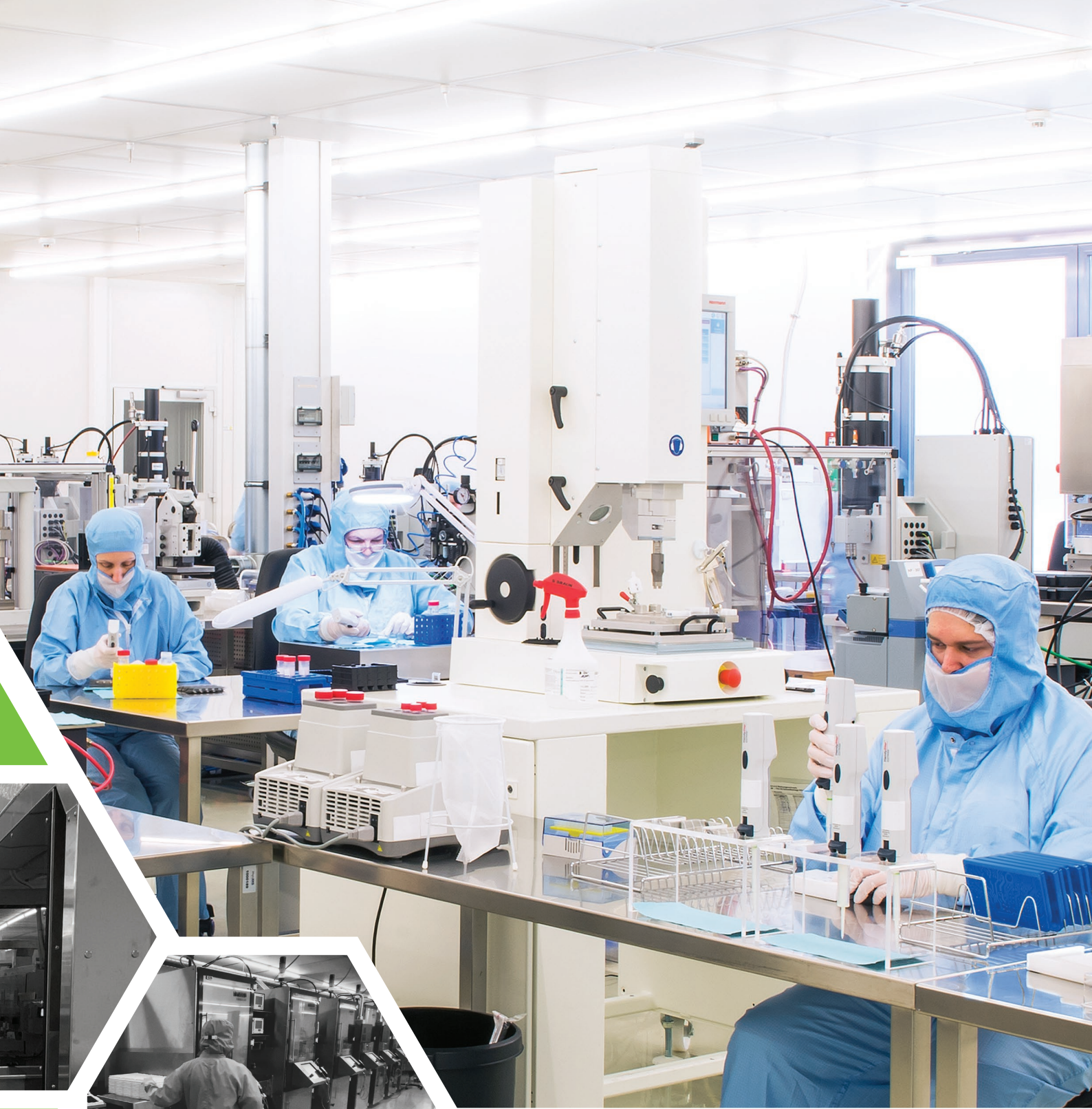
MINIMAL
TIME-TO-MARKET



RELIABLE
SOURCING



COMPLETE
FULFILLMENT



ISO 13485



Global Leaders

thinXXS Microtechnology is a global leader in the development and production of microfluidic consumables. Within the IDEX Health & Science Group, we work in a global network with over 7,000 employees worldwide.

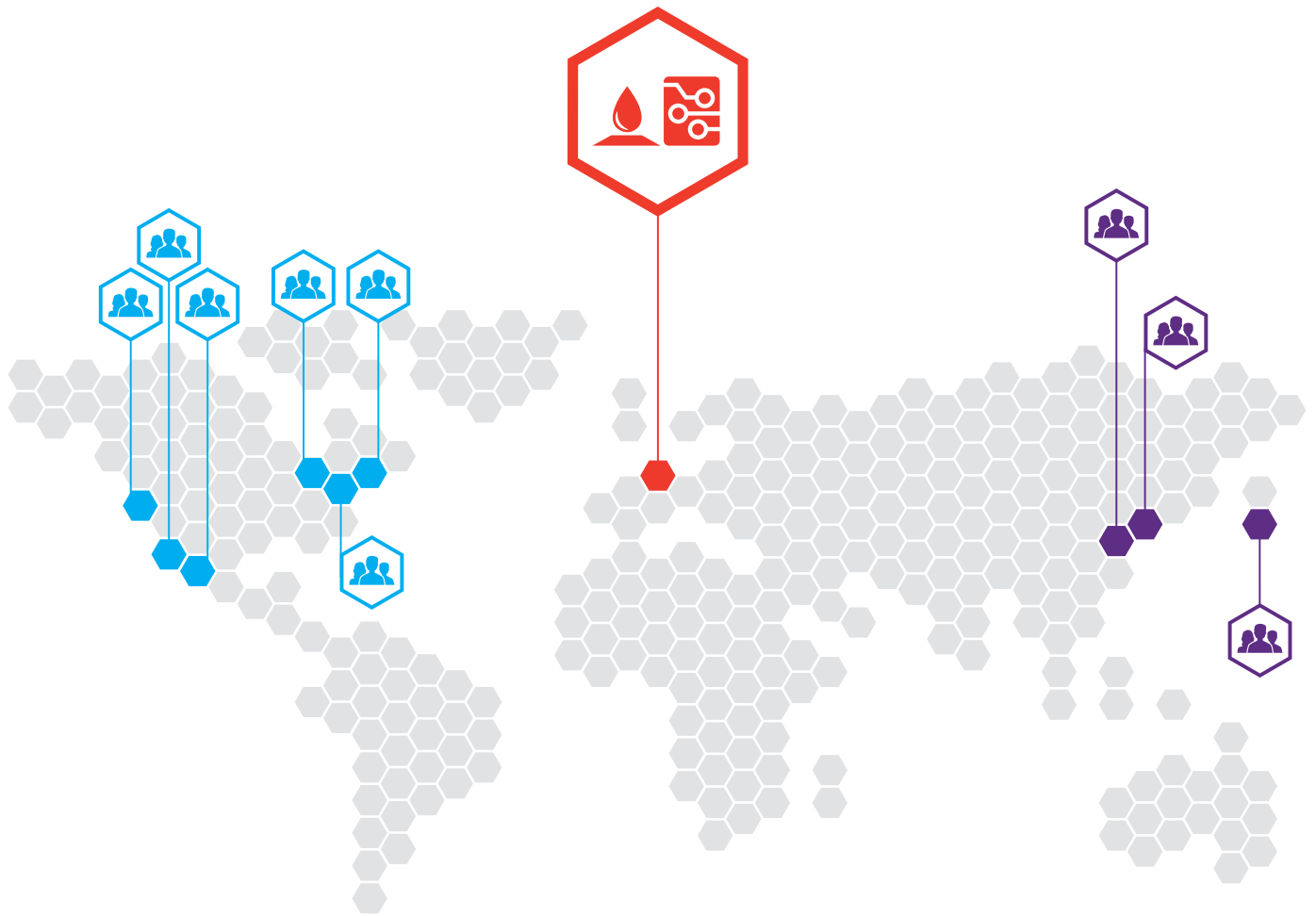
YOU SEE INNOVATION, WE SEE INTEGRATION

Whether you're pursuing a complex consumables design or a life-of-instrument flow cell, we support and guarantee your success with extensive experience that unites the intersections of fluidics, optics, and chemistry. We are a strong force of committed people and innovative products for your complete optofluidic pathway. We are continually increasing our product offering, expanding our market relevance by connecting to new customers, and positioning ourselves as global leaders in optofluidics engineering.

CORPORATE RESPONSIBILITY

We are committed to preserving the environment. Our continuous improvement programs hold our facilities accountable to reduce waste, prevent pollution, and conserve resources.





North America

Bristol, CT, USA Oak Harbor, WA, USA
 Carlsbad, CA, USA Rochester, NY, USA
 Middleboro, MA, USA Rohnert Park, CA, USA

Europe

Zweibrücken,
 Germany

Asia

Saitama, Japan
 Shanghai, China
 Beijing, China

thinXXS
 ● MICROTECHNOLOGY

Development and
 production of disposable
 microfluidic devices.



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For ordering and technical support,
please visit www.thinxxs.com